# Service Manual

# F – X88ZL

FM/AM DIGITAL SYNTHESIZER TUNER

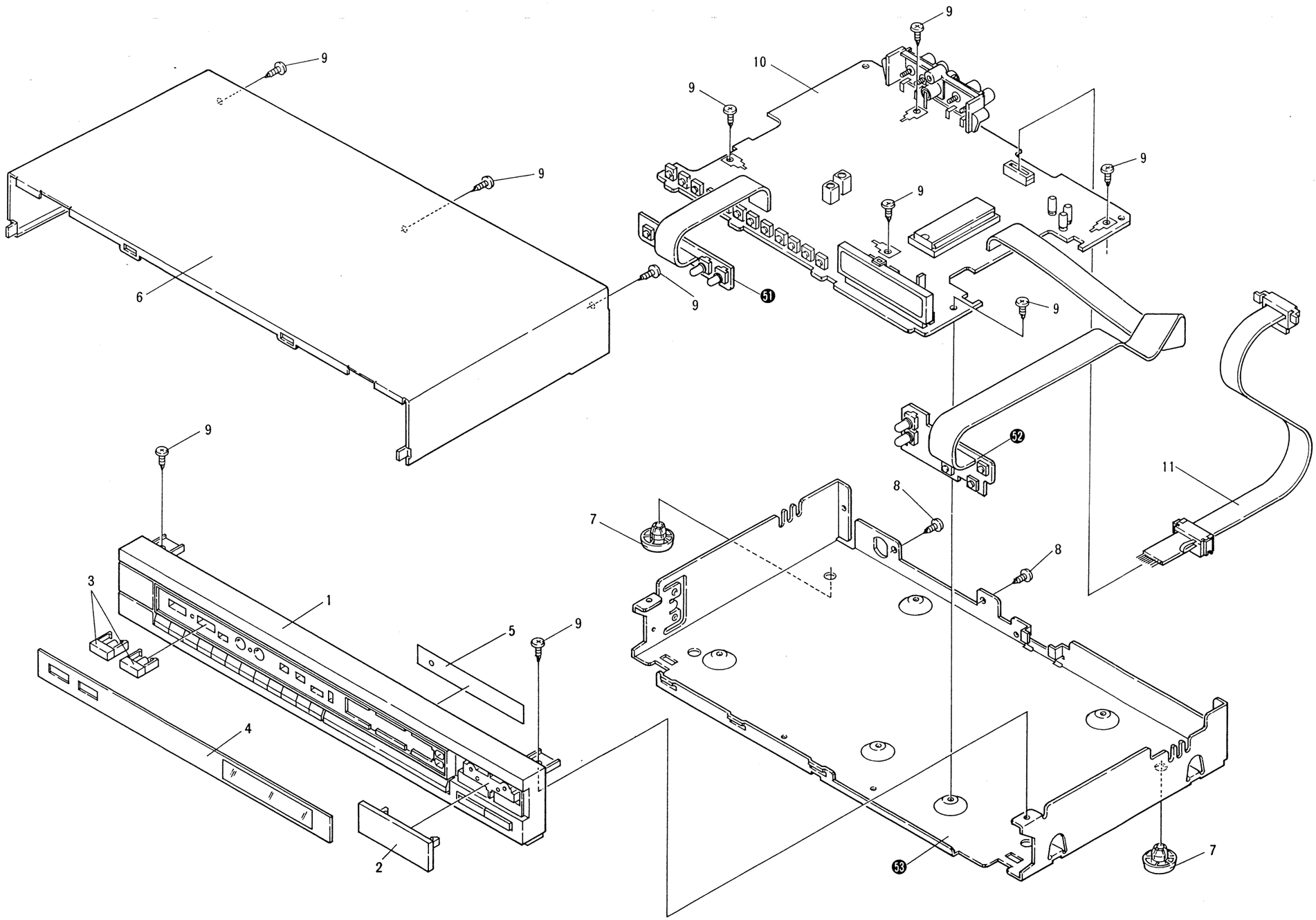
ORDER NO.
ARP 1306

JAN.1987

LFDNR 1666

FACH XQ 299

PIONEER®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# 3. EXPLODED VIEWS AND PARTS LIST

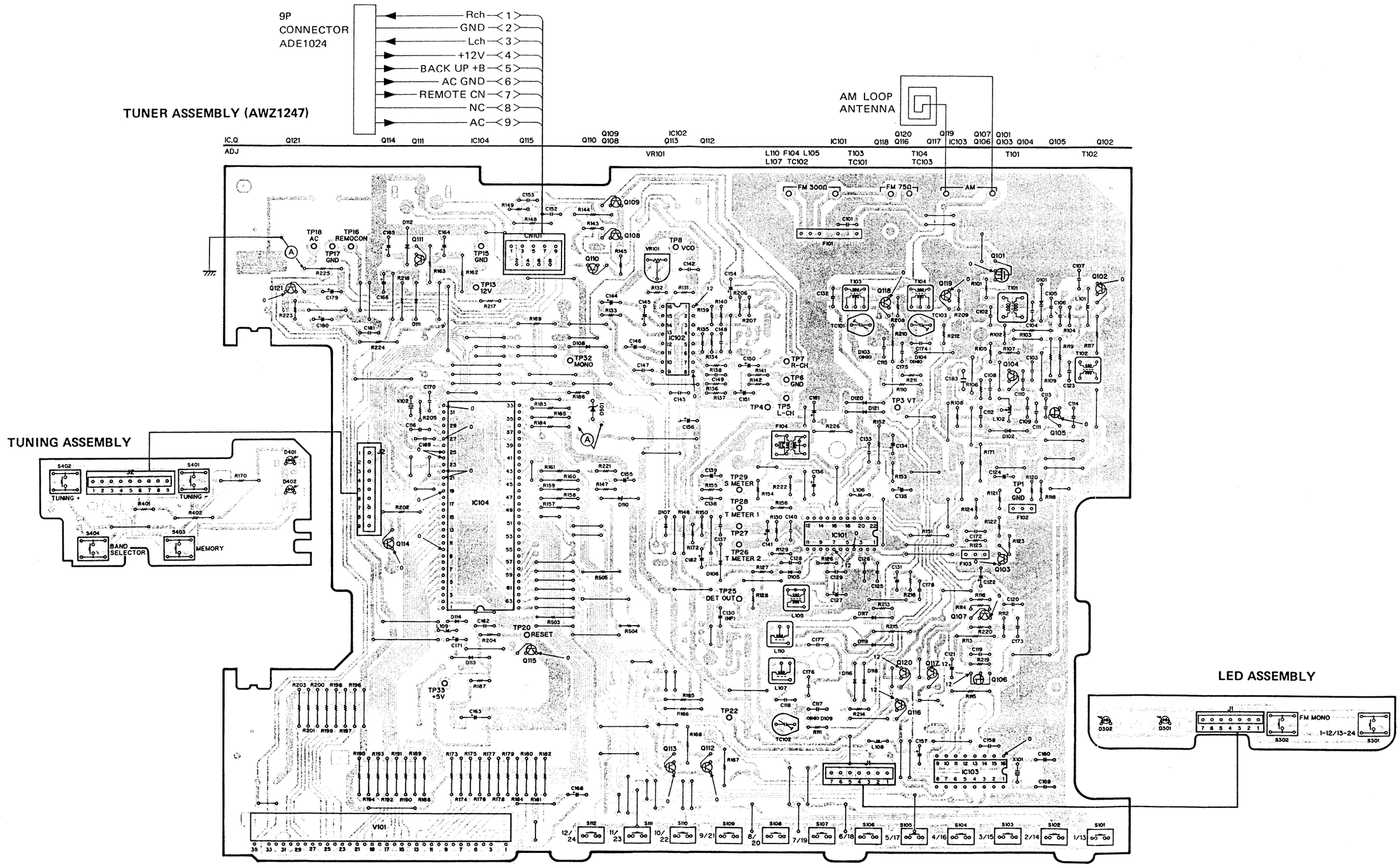
*NOTES:*

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  *★★ GENERALLY MOVES FASTER THAN ★*
  *This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

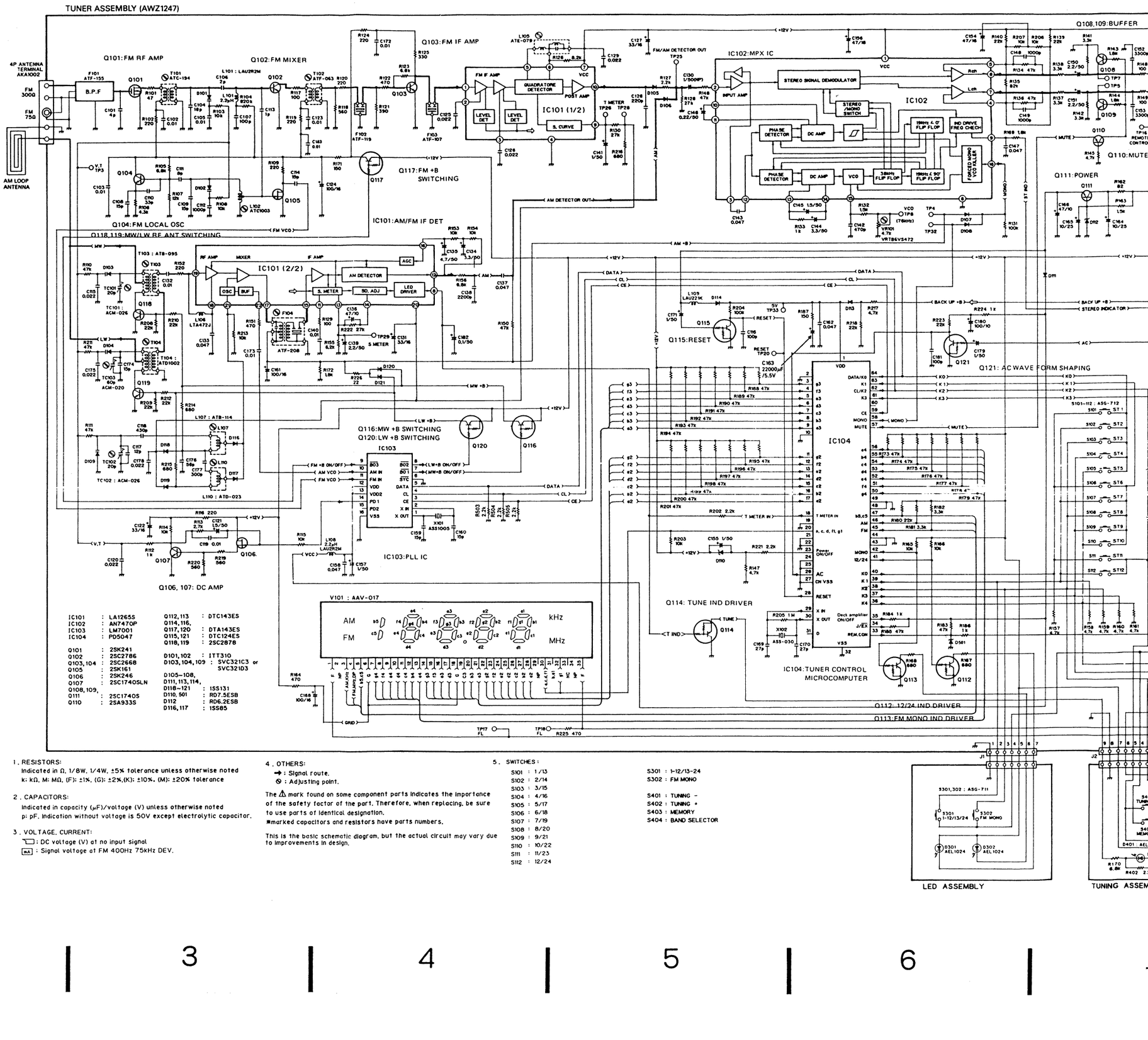
## ● Parts List

| Mark | No. | Part No. | Description |
|---|---|---|---|
| | 1. | AMB1146 | Front panel assembly |
| | 2. | AAC1006 | Knob cap |
| | 3. | AAD1107 | Push knob |
| | 4. | AAK1181 | IND. panel |
| | 5. | AAK1189 | FL filter |
| | 6. | ANE1062 | Bonnet case |
| | 7. | AMR1002 | Foot assembly |
| | 8. | ABA-298 | Screw |
| | 9. | ABA1009 | Screw |
| | 10. | AWZ1247 | Tuner assembly |
| | 11. | ADE1024 | Connection cable |
| | 51. | | LED assembly |
| | 52. | | Tuning assembly |
| | 53. | | Chassis |

# 4. P.C. BOARDS CONNECTION DIAGRAM



# 5. SCHEMATIC DIAGRAM




| | | | | | |
|---|---|---|---|---|---|
| IC101 | : LA1265S | Q112, 113 | : DTC143ES | | |
| IC102 | : AN7470P | Q114, 116, | | | |
| IC103 | : LM7001 | Q117, 120 | : DTA143ES | | |
| IC104 | : PD5047 | Q115, 121 | : DTC124ES | | |
| | | Q118, 119 | : 2SC2878 | | |
| Q101 | : 2SK241 | | | | |
| Q102 | : 2SC2786 | D101, 102 | : ITT310 | | |
| Q103, 104 | : 2SC2668 | D103, 104, 109 | : SVC321C3 or SVC321D3 | | |
| Q105 | : 2SK161 | | | | |
| Q106 | : 2SK246 | D105–108, | | | |
| Q107 | : 2SC1740SLN | D111, 113, 114, | | | |
| Q108, 109, | | D118–121 | : 1SS131 | | |
| Q111 | : 2SC1740S | D110, 501 | : RD7.5ESB | | |
| Q110 | : 2SA933S | D112 | : RD6.2ESB | | |
| | | D116, 117 | : 1SS85 | | |

1. RESISTORS:
Indicated in Ω, 1/8W, 1/4W, ±5% tolerance unless otherwise noted
k: kΩ, M: MΩ, (F): ±1%, (G): ±2%,(K): ±10%, (M): ±20% tolerance

2. CAPACITORS:
Indicated in capacity (μF)/voltage (V) unless otherwise noted
p: pF, Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT:
: DC voltage (V) at no input signal
mA : Signal voltage at FM 400Hz 75kHz DEV.

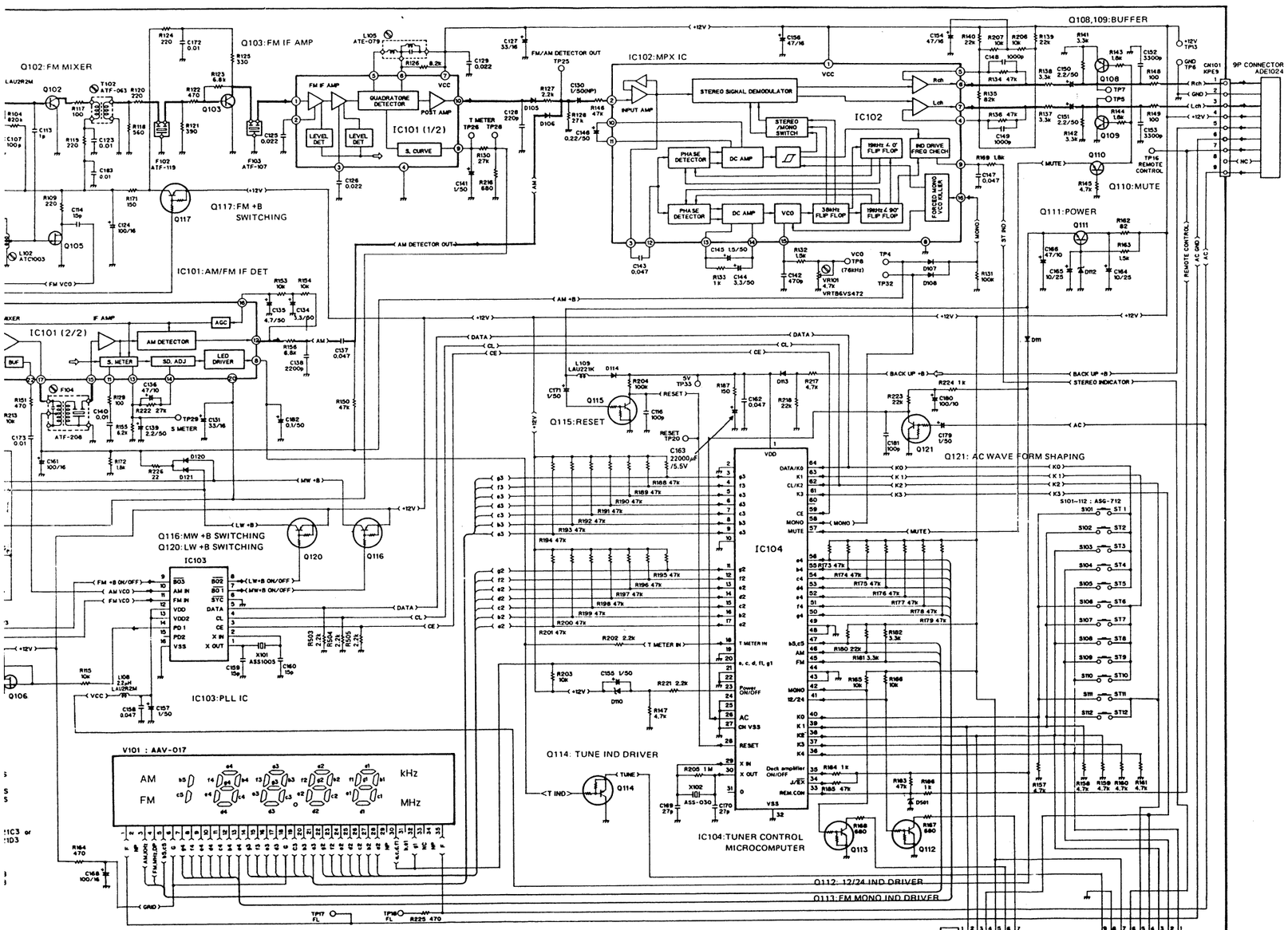
4. OTHERS:
➔ : Signal route.
⊘ : Adjusting point.

The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
*marked capacitors and resistors have parts numbers.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

5. SWITCHES:

| | | | |
|---|---|---|---|
| S101 | : 1/13 | S301 | : 1-12/13-24 |
| S102 | : 2/14 | S302 | : FM MONO |
| S103 | : 3/15 | | |
| S104 | : 4/16 | S401 | : TUNING − |
| S105 | : 5/17 | S402 | : TUNING + |
| S106 | : 6/18 | S403 | : MEMORY |
| S107 | : 7/19 | S404 | : BAND SELECTOR |
| S108 | : 8/20 | | |
| S109 | : 9/21 | | |
| S110 | : 10/22 | | |
| S111 | : 11/23 | | |
| S112 | : 12/24 | | |




4. OTHERS:
   - ➡ : Signal route.
   - ⊘ : Adjusting point.

The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
*marked capacitors and resistors have parts numbers.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

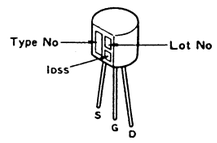
5. SWITCHES :
   - S101 : 1/13
   - S102 : 2/14
   - S103 : 3/15
   - S104 : 4/16
   - S105 : 5/17
   - S106 : 6/18
   - S107 : 7/19
   - S108 : 8/20
   - S109 : 9/21
   - S110 : 10/22
   - S111 : 11/23
   - S112 : 12/24

- S301 : 1-12/13-24
- S302 : FM MONO

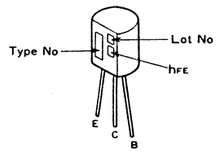
- S401 : TUNING -
- S402 : TUNING +
- S403 : MEMORY
- S404 : BAND SELECTOR

## External Appearances of Transistors and ICs

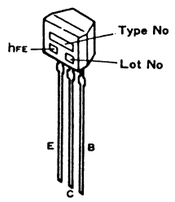
2SK246



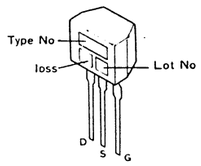

2SC2878



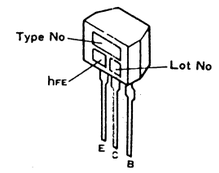

2SC2786



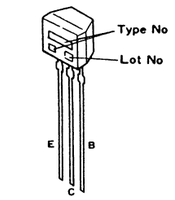

2SK161
2SK241



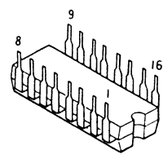

2SA933S
2SC1740S
2SC1740SLN



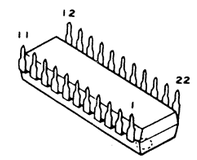

DTA143ES
DTC124ES
DTC143ES



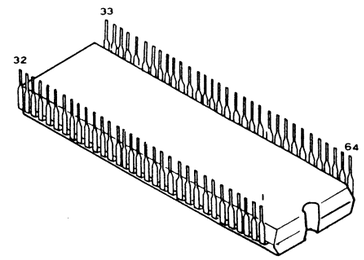

AN7470P
LM7001




LA1265S




PD5047




# 6. ELECTRICAL PARTS LIST

*NOTES:*

- *Parts without part number cannot be supplied.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  *★★ GENERALLY MOVES FASTER THAN ★*
  *This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.*
- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*

*Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).*

| | | | |
|---|---|---|---|
| *560Ω* | *56 × 10¹* | *561* | *RD1/4PS 5 6 1 J* |
| *47kΩ* | *47 × 10³* | *473* | *RD1/4PS 4 7 3 J* |
| *0.5Ω* | *0R5* | | *RN2H 0 R 5 K* |
| *1Ω* | *010* | | *RS1P 0 1 0 K* |

*Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).*

| | | | |
|---|---|---|---|
| *5.62kΩ* | *562 × 10¹* | *5621* | *RN1/4SR 5 6 2 1 F* |

### Miscellaneous Parts

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | Tuner assemboy<br>Tuning assembly<br>LED assembly | AWZ1247 |

### Tuner Assembly (AWZ1247)

#### SEMICONDUCTORS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| ★★ | IC102 | AN7470P |
| ★★ | IC101 | LA1265S |
| ★★ | IC103 | LM7001 |
| ★★ | IC104 | PD5047 |
| ★★ | Q114, Q116, Q117, Q120 | DTA143ES |
| ★★ | Q115, Q121 | DTC124ES |
| ★★ | Q112, Q113 | DTC143ES |
| ★★ | Q110 | 2SA933S |
| ★★ | Q108, Q109, Q111 | 2SC1740S |
| ★★ | Q107 | 2SC1740SLN |
| ★★ | Q103, Q104 | 2SC2668 |
| ★★ | Q102 | 2SC2786 |
| ★★ | Q118, Q119 | 2SC2878 |
| ★★ | Q105 | 2SK161 |
| ★★ | Q101 | 2SK241 |
| ★★ | Q106 | 2SK246 |
| ★ | D101, D102 | ITT310 |
| ★ | D112 | RD6.2ESB |
| ★ | D110, D501 | RD7.5ESB |
| ★ | D103, D104, D109 | SVC321C3<br>(SVC321D3) |
| ★ | D105 – D108, D111, D113, D114, D118 – D121 | 1SS131 |
| ★ | D116, D117 | 1SS85 |

#### SWITCHES

| Mark | Symbol & Description | Part No. |
|---|---|---|
| ★★ | S101 – S112 Tact switch (STATION) | ASG-712 |

#### COILS, TRANSFORMERS AND FILTERS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | L107 AM OSC coil | ATB-114 |
| | L102 FM coil | ATC1003 |
| | L110 LW OSC coil | ATD-023 |
| | L105 FM DET coil | ATE-079 |
| | L101, L108 Axial inductor | LAU2R2M |
| | L109 Axial inductor | LAU221K |
| | L106 Inductor | LTA472J |
| | T103 AM ANT transformer | ATB-095 |
| | T101 FM RF transformer | ATC-194 |
| | T104 LW ANT transformer | ATD1002 |
| | T102 FM matching transformer | ATE-063 |
| | F103 FM ceramic filter | ATF-107 |
| | F102 FM ceramic filter | ATF-119 |
| | F101 FM bandpass filter | ATF-155 |
| | F104 AM ceramic filter | ATF-208 |

#### CAPACITORS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | C163 (22000μF/5.5V) | ACH1023 |
| | TC103 Ceramic trimmer | ACM-020 |
| | TC101, TC102 Ceramic trimmer | ACM-026 |
| | C116, C181 | CCCSL101J50 |
| | C113 | CCDCH010C50 |
| | C106 | CCDCH020C50 |
| | C101 | CCDCH040C50 |
| | C111 | CCDCH080D50 |
| | C108, C114, C159, C160, C174 | CCDCH150J50 |
| | C169, C170 | CCDCH270J50 |

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | C110 | CCDCH330J50 |
| | C176 | CCDCH560J50 |
| | C104 | CCDRH180J50 |
| | C107 | CCDSL101J50 |
| | C128 | CCDSL221J50 |
| | C109 | CCDTH150J50 |
| | C117 | CCDUJ120J50 |
| | C130 | CEANP010M50 |
| | C146 | CEASR22M50 |
| | C182 | CEASOR1M50 |
| | C141, C155, C157, C171, C179 | CEAS010M50 |
| | C121, C145 | CEAS1R5M50 |
| | C164, C165 | CEAS100M25 |
| | C180 | CEAS101M10 |
| | C124, C161, C168 | CEAS101M16 |
| | C139, C150, C151 | CEAS2R2M50 |
| | C134, C144 | CEAS3R3M50 |
| | C122, C127, C131 | CEAS330M16 |
| | C135 | CEAS4R7M50 |
| | C136, C166 | CEAS470M10 |
| | C154, C156 | CEAS470M16 |
| | C148, C149 | CKCYB102K50 |
| | C138 | CKCYB222K50 |
| | C152, C153 | CKCYB332K50 |
| | C119, C132, C140 | CKCYF103Z50 |
| | C120 | CKCYF223Z50 |
| | C133, C143, C147 | CKCYF473Z50 |
| | C137 | CKCYX473M25 |
| | C112 | CKDYB102K50 |
| | C102, C103, C105, C123, C172, C173 | CKDYF103Z50 |
| | C115, C125, C126, C129, C175, C178 | CKDYF223Z50 |
| | C158, C162 | CKDYF473Z50 |
| | C177 | CQSA301J50 |
| | C118 | CQSA431J50 |
| | C142 | CQSA471J50 |
| | C183 | CKDYF103Z50 |

### RESISTORS

| Mark | Symbol & Descriptiofn | | Part No. |
|---|---|---|---|
| ★ | VR101 | Semi-fixed (4.7kΩ) | VRTB6VS472 |
| | R226 | | RD1/2PM220J |
| | R162, R167, R168, R170, R171, R225 | | RD1/4PM□□□J |
| | | Other resistors | RD1/8PM□□□J |

### OTHERS

| Mark | Symbol & Description | | Part No. |
|---|---|---|---|
| | | Antenna terminal (4P) (PAL) | AKA1002 |
| ★ | V101 | Fluorescent tube | AAV-017 |
| ★ | X102 | Ceramic resonator | ASS-030 |
| ★ | X101 | Crystal resonator | ASS1005 |

## Tuning Assembly

### SEMICONDUCTORS

| Mark | Symbol & Description | | Part No. |
|---|---|---|---|
| ★ | D402 | LED assembly | AEL1009 |
| ★ | D401 | LED assembly | AEL1024 |

### SWITCHES

| Mark | Symbol & Description | | Part No. |
|---|---|---|---|
| ★★ | S401 – S404 | Tact switch (TUNING–, TUNING+, MEMORY, BAND) | ASG-711 |

### RESISTORS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | R401 | RD1/8PM332J |

## LED Assembly

### SEMICONDUCTORS

| Mark | Symbol & Description | | Part No. |
|---|---|---|---|
| ★ | D301, D302 | LED assembly | AEL1024 |

### SWITCHES

| Mark | Symbol & Description | | Part No. |
|---|---|---|---|
| ★★ | S301, S302 | Tact switch (FM MONO, STEREO) | ASG-711 |

# 8. ADJUSTMENT

## PREPARATION

- Connect TP15 (GND) with TP17 (GND).
- Supply DC 12V between TP18 and TP17, and between TP13 and TP15 (see Fig. 8-1).

### FM Tuner Adjustment

- Make the wire connections as shown in Fig. 8-2.
- Set the function to FM.

| Step No. | FM SG (1kHz ± 75kHz dev.) | | F-X88ZL Reception Frequency Display | Adjustment | |
|---|---|---|---|---|---|
| | Frequency (MHz) | Level (dBμ) | | Adjustment Location | Specifications |
| 1 | 98.0 | 60 | 98.0MHz | L105 | Adjust so that DC voltage is 0V ± 0.1V for TP28 (TMETER 1) and TP26 (TMETER 2). |
| 2 (*3) | 98.0 | 60 | 98.0MHz | T101, T102 | Adjust the output terminal (TP5: L ch, TP7: Rch) voltage to the maximum. |
| 3 | – | – | 98.0MHz | VR101 | Ground TP25 through the 220μF capacitor, and adjust the frequency of TP8 to 76kHz ± 200Hz. |
| 4 | 98.0 *1 (stereo modulation) | 60 | 98.0MHz | T102 | Adjust the output terminal (TP5: Lch, TP7: Rch) distortion to the minimum. |

(*1) Stereo Modulation: Main 1kHz L + R ± 68.25Hz dev.
Pilot 19kHz ± 6.75kHz dev.

(*3) The method of adjustment in step 2 is different for F-X88Z/ZEZ type. For details, refer to service manual (ARP1341) for type F-X88Z/ZEZ.

### MW Tuner Adjustment

- Make the connections as shown in Fig. 8-3.
- Set the function to MW.

| Step No. | AM SG (400Hz, 30% modulation) | | F-X88ZL Reception Frequency Display | Adjustment | |
|---|---|---|---|---|---|
| | Frequency (kHz) | Level (dBμ) | | Adjustment Location | Specifications |
| 1 | – | – | 531kHz | L107 | Adjust TP3 (VT) to 1.3V ± 0.1V. |
| 2 | – | – | 1602kHz | TC102 | Adjust TP3 (VT) to 10V ± 0.5V. |
| 3 | 603 | Level at which output is not saturated. | 603kHz | T103 (*2) | Adjust the output terminal (TP5: L ch, TP7: R ch) voltage to the maximum. |
| 4 | 1395 | | 1395kHz | TC101 (*2) | |

(*2) F104 is adjusted for F-X88Z/ZIOX1B type.

### LW Tuner Adjustment

- Make the connections as shown in Fig. 8-3.
- Set the function to LW.
- F-X88ZL/ZEB type only.

| Step No. | AM SG (400Hz, 30% modulation) | | F-X88ZL Reception Frequency Display | Adjustment | |
|---|---|---|---|---|---|
| | Frequency (kHz) | Level (dBμ) | | Adjustment Location | Specifications |
| 1 | — | — | 281kHz | L110 | Adjust TP3 (VT) to 5.2V. |
| 2 | 164 | Level at which output is not saturated. | 164kHz | T104 | Adjust the output terminal (TP5: L ch, TP7: R ch) voltage to the maximum. |
| 3 | 254 | | 254kHz | TC103 | |

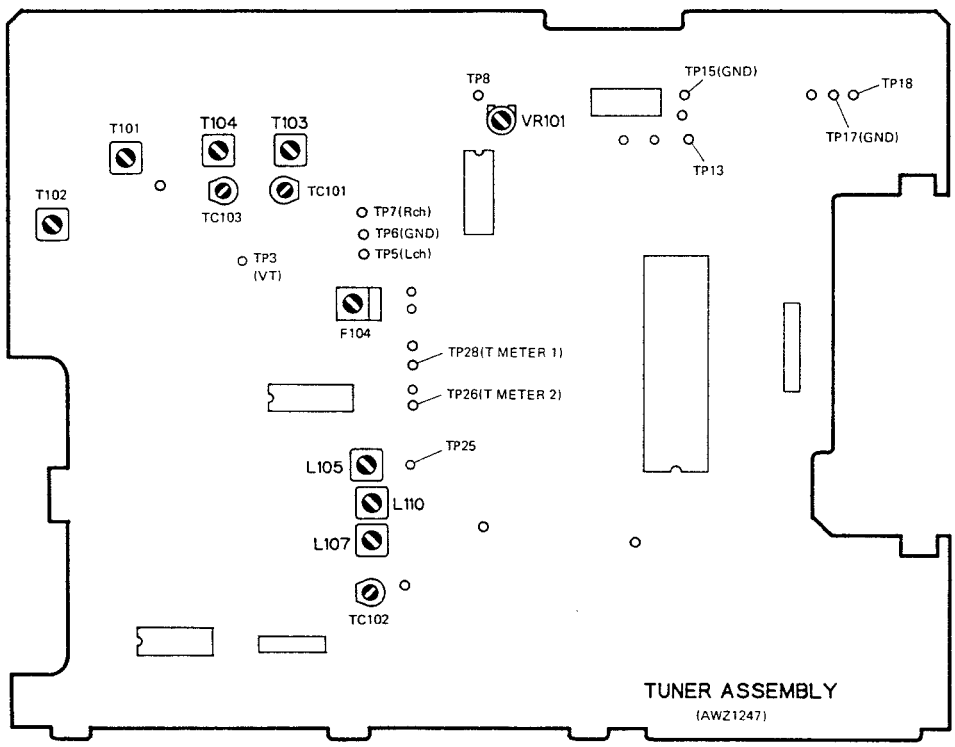



Fig. 8-1 Adjustment point

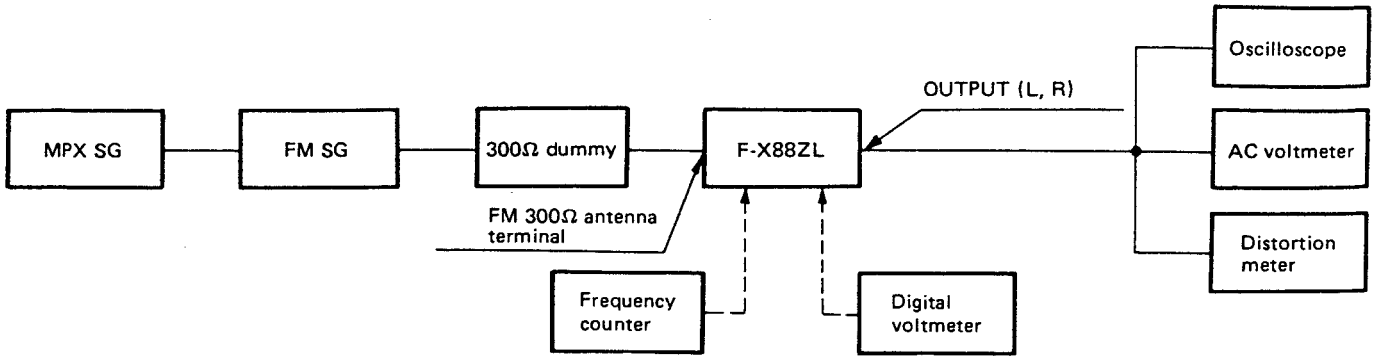



Fig. 8-2 FM Tuner Connection

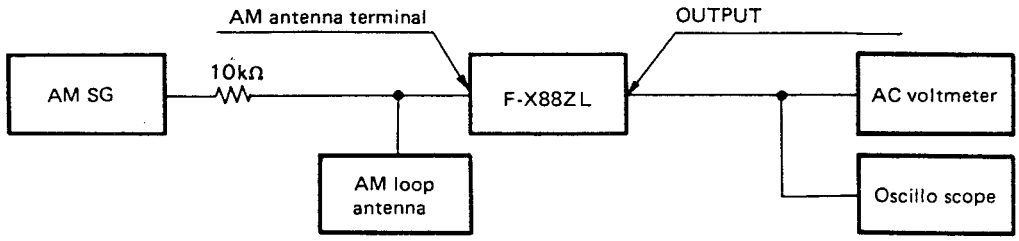



Fig. 8-3 AM Tuner Connection